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AUTHOR Langer, Jonas
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ABSTRACT

Techniques for developing the potential of culturally deprived people cannot be developed without more knowledge of the basic mechanisms of mental change. Psysiological generation and regeneration are both apparently governed by the same set of mechanisms. Regeneration is possible only when a part of the damaged structure is left, and these mechanisms are part of its genetic blueprint. Since psychological phenomena are a subclass of biological phenomena, we may expect the same convergence for mental change. Any developmental process of mental regeneration begins at some point on the sequence of stage organization. It appears, although the evidence is much more tenuous than on physiological regeneration, that developmental rehabilitation ends at some point further along the stage sequence. If the beginning and end stages of mental regeneration are the same as mental generation, then there should be fundamental convergence between their courses and mechanisms. It is this theoretical deduction that requires much empirical investigation if success in developing the potential of culturally deprived people is to be attained. [Not available in hard copy because of marginal legibility of original document.] (Author/JM)

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MENTAL REGENERATION

Jonas Langer

University of California, Berkeley

The proposition I wish to present for your consideration is simple--the best bet for cognitive, and probably personal and social, reeducation or redevelopment is self-generated structural regeneration. There are sound theoretical and empirical grounds for this proposition that I will now proceed to sketch briefly.

To begin with it is necessary, I am afraid, to consider, once again, the term reeducation or redevelopment that we have heard so much about at this conference. It seems to refer to all those forms of intervention that Youth Aliyah undertakes in order to help young adolescents who are deviant from the typical Israeli pattern of ontogenesis or individual development. That deviancy, it seems, covers a variety of types--it includes apparent retardation, arrest, and regression of development. The causes of these deviant types of ontogenesis is ascribed to a variety of sources, both intra-psychic and extra-psychic. But the most interesting etiological feature is the ascription of much, if not most, of the deviancy dealt with by Youth Aliyah to cultural deprivation.

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To begin to understand this form of etiological characterization of deviant development it is at least necessary to analyze the general parameters of cultural deprivation. This will then require a characterization of the universal features of normal human ontogenesis against which it

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becomes logically possible to assess deviant developments. The comparison of normal with deviant developments will provide the basis for the specification of the principles of mental regeneration. These principles are at the root of the proposition that self-generative change is the prime source of reeducation.

Cultural Deprivation

The term cultural deprivation is still shrouded in much mystery; and for good reason--it is difficult to define it in a precisely measurable fashion at this point and so there is bound to be disagreements amongst researchers and workers in the field. Yet it seems crucial to clarify, as much as possible, what the concept of cultural deprivation refers to since it is a prime source of the deviant forms of individual development. So I will hazard some definitional parameters in order that you will at least know what I am referring to. Cultural deprivation may refer to impoverishment in (1) the person's forms of constructive interaction with his social and physical environment and (2) the person's knowledge of the content, or information present in his social and physical environment.

The content of the person's knowledge is limited by the types of interactions he has with his environment. (It should be indicated, but discussed next, that the content of the person's interactions is limited by the form of his structures for interaction.) The patterns of environmental stimulation provide the physical and social information necessary, but not sufficient, to enculturate the person. Now if I understand correctly there is general agreement that the adolescents dealt with by Youth Aliyah are impoverished in their knowledge of the content of Israeli culture.

The prime index of this is varying degrees of difficulty with the Hebrew language, but the deficit may extend to some or much ignorance of Israeli social customs and Western physical, logical, ethical, and aesthetic concepts. If they are new immigrants, the adolescents may or may not be deprived of the informational content of the cultures from which they have emigrated. But it is a good bet that if they did not come deprived of the knowledge of their original culture, all but the most intellectually hardy will be quickly deprived of that knowledge.

The notion of forms of interaction is often less well appreciated even though it is more important for the understanding of development. The forms of interaction are those organized patterns of acting that develop universally in all people regardless of the particular culture and physical environment in which they find themselves. The forms of interaction are progressively transformed in the course of ontogenesis from sensorimotor actions to formal mental operations that will be outlined in the next section. This progressive transformation constitutes the universal sequence of stages that is species-specific to human development.

Impoverishment in the adolescent's forms of constructing meaningful interactions with his physical and social environment, so that he is unable to acquire the amount and kind of cultural content typically learned by adolescents, is much more difficult to determine in a precisely measured fashion than assessment of deficit in the content of his interaction. What makes it particularly difficult to assess individual deprivation in forms of interaction is the further complication that we must distinguish between (1a) the person's potential forms for constructive interaction from (1b) the actualized forms he manifests at any given moment. This is a very delicate

matter of diagnosis which becomes obvious if one only realizes that the actualized level of performance is always equal to or less than the true potential competence for forms of interaction. The hazards of diagnosing potential competence from actual performance are many. And the diagnosis will tend to be conservative.

To counteract this built-in conservatism in diagnosis two strategies seem appropriate. The first is theoretical and reads as follows. Unless you have sound counterindication, presume that the individual you are dealing with has the same potential for development as all other individuals. The second strategy is empirical and can be accomplished by two methods. One is clinical assessment. Diagnosis of the person's developmental level should be based upon a battery of tests in order to seek out peaks of functioning that outstrip the person's average level of performance. The other method is educational assessment. Introduce the person to a variety of learning experiences on linguistic and conceptual tasks in order to obtain a fine-grained picture of what he can learn to appreciate, comprehend and produce from direct tuition. Using these two methods one should come closer to accurately assessing the relative impairment of the person's potential and actualized forms of interaction.

These two strategies seem to form the basis for an optimistic diagnosis of the forms of cultural deprivation of adolescents in Youth Aliyah. The cultural deprivation seems to be in content of knowledge and actualized forms of interaction, but not in potential forms of interaction. Most culturally deprived adolescents dealt with by Youth Aliyah are probably quite educable.

Normal Ontogenesis

The stages of human development are composed of a theoretical sequence of potential forms of interaction (cf. Langer, 1969, pp. 107-148; Langer, 1970). This sequence will be sketched briefly with most attention given to adolescent development since that is our particular focus here.

The cycle of individual development begins with the newborn's initial actions. These are overt sensorimotor performances upon his environment. They serve to transform the human's initial organization which is predominantly biological into an organization that in its sensorimotor form is predominantly biopsychological. The fundamental product of this first stage of development is already the construction of a cognition of oneself and one's environment. But it is a highly idiosyncratic construction.

The first major shift from predominantly biopsychological to predominantly psychosocial evolution begins between the ages of a year-and-a-half and two years. Its major mark is the shift from overt sensorimotor acts to covert mental acts. Its major instrument is the development of symbolic operations. Its major consequence is representational, as well as presentational, interactions. It is directed primarily toward the progressive construction of the concretely actual, physical and the conventional, social nature of oneself and one's milieu that transcends the child's idiosyncratic cognitions constructed during the sensorimotor stage.

When he has well established the actual properties of his interactions, such as their spatial and causal properties, the adolescent begins to be ready to perform formal operations. The major consequence is the construction of formal, logical and ideological theories of physical and social

conduct. These theories come to stand relatively independent of particular events or instances and to consider actual events as merely a subset of what are possible perspectives.

Formal operations include the abstract reflective operation of thinking about one's own thinking. This leads the adolescent and young adult to the construction of the possibilities as well as the actualities of his interactions and his own status. Thus, the most mature form of his self-development will be the construction of a principled, logical hierarchy of values that guide his conduct. This requires being able to see interactions from the perspective of others as well as oneself. This hierarchy of values constitutes the individual's personal ideology and typically integrates ethical, aesthetic and logical principles (Langer, 1970a).

The child's symbolic operations are directed towards the representation of the physical and conventional (social) actualities of his environment and himself, while the adolescent's and adult's formal operations are more principled and flexible. Formal operations permit thinking about one's own thinking; whereas symbolic operations are more limited to the construction of direct thought or ideas about empirical events. Formal thought goes beyond empirical actualities to flexibly construct theories of the operation of physical events and ideologies about personal and social conduct and values. This means that formal operations construct the possibilities of the person's interactions as well as the actualities. They construct the hypothetical or logical possibilities that are deductively necessary in order to understand events and integrate them with empirical, inductive means of verification. This is the mental basis for the highest forms of principled conduct and understanding that relates one's own perspectives

with that of others in a logical and moral way.

In short, personal development is first directed towards the construction of an idiosyncratic and egocentric view of oneself, his interactions, and his environment. In its next major phase personal development is directed outward--towards determining and coming into correspondence with the actual, physical and the conventional, social assessment of oneself, his interactions, and his environment. The final, most mature stage of development is a kind of return to the self. The person forms his own world view that takes into account multiple perspectives by integrating his own logical and ethical principles with physical and conventional realities.

Potential vs. Actual Stages. The sequence of stages just described is a potential sequence, not an actual sequence. All individual progress should follow this sequence but not all individuals will actualize their potential and develop to the most mature level possible. The central developmental thesis is that the sequence of mental stages are like a sequence of embryonic stages. The organization of each stage is logically implied and rendered necessary by the preceding ones without being contained by them (Piaget, 1967; Langer, 1969).

There is both continuity and discontinuity between the organization of each stage in the sequence. This means that earlier forms of interaction, such as sensorimotor acts, are not lost in the course of development but are hierarchically integrated in the form appropriate at more advanced levels (Werner, 1948; Langer, 1969). For example, as adults we retain our manipulatory or sucking capacities, but we perform such acts in a more mature form.

It is possible to specify two precise criteria for testing the adequacy

of the stages of individual development portrayed here. The first is that the succession of the stages are lawful and universal. All individuals must develop in the order of the prescribed sequence, although the tempo may differ from individual to individual and some individuals may not reach the most mature stage.

The evidence on the universality of the sequence is fairly comprehensive and consistent. Our descriptions of the developing individual's progressive physical, logical and moral constructions are supported by the cross-cultural data collected to date. Illustrative cross-cultural data on moral development reported by Kohlberg (1969) make the point. Two important features of these data must be underlined. First, the same sequence of moral stages and approximately the same rate of development obtains for all cultures examined. Second, few individuals in all cultures seem to actualize their developmental potential to the most mature levels. This is true even for the longitudinal data on individuals up to the age of thirty (Kramer, 1968).

The second criterion for testing the stage sequence is that the sequence tends to conserve itself. This criterion leads to three explicit developmental predictions: (1) Individual progress does not permit skipping any stage in the sequence. (2) The organization of mental capacities at each stage is resistant to extrinsic attempts at accelerating the autogenetic rate of progress to the next stage in the sequence. (3) The organization at each stage is resistant to extrinsic inducement to "regress" to the previous stage through which the person has already passed. The general idea, then, is that different individual experience and training should have little effect upon the person's development through this sequence of stages. In-

vestigation of the effects of teaching upon stage development are, therefore, an important way of testing the theoretical sequence.

The evidence from training studies clearly support the hypothesis that the sequence of stages are almost totally resistant to induced progress or regress and to skipping (e.g., Kohlberg, 1968; Inhelder & Sinclair, 1969; Strauss & Langer, in press; Mermelstein & Meyer, 1969). Again we might just mention by way of illustration some data on moral development. In a series of studies, Turiel (1966, 1969) investigated the effect of training upon the level of moral judgment. He found some small progress to one stage above the subject's initial level due to training; and essentially no progress to two stages above and no regress to one stage below the subject's initial level.

To date, then, the evidence from cross-cultural and training studies gives strong support to the lawful and universal sequence of mental development that we have sketched. We must underline, however, that this is an ideal theoretical sequence. Much further work is necessary to determine the optimal kinds of experience and teaching that will foster individuals to actualize their rich developmental potential even in those ordinary circumstances where there is no question of cultural deprivation.

The Process of Stage Change. The evidence on stage development that was briefly reviewed is consistent with the theory that long-term, ontogenetic change is fundamentally a self-generated process of equilibration (Piaget, 1967; Langer, 1969, 1969a). Equilibration is a twofold process of organization and adaptation. All organisms, however primitive, are born organized, however rudimentarily. This innate organization is the structural basis for the individual's initial interaction with his environment. It determines

the form in which he structures that initial interaction. Consequently, it determines the form in which he structures the environment to himself. Von Uexkull (1934) has given us some hints of how the different organization of various species differentially structure their environment or Umwelt. Here, we are concerned with how the human differentially structures his interactions with his physical and social environment at progressive stages of his developing organization.

All organisms are also born adaptive. Adaptation is the functional basis for the individual's forms of interaction with his environment. The individual's initial organization sets the limits to the way in which he can function in his environment. For example, whereas the newborn infant is equipped with the reflexive structures for sucking or turning away from a noxious stimulus he is, of course, not yet equipped with the structures necessary to engage in a conversation or to solve a mathematical problem. Consequently, he is also not yet equipped to acquire the informational content that these latter forms of interaction permit.

The latter, more sophisticated forms of interaction, are dependent upon the development of advanced personal organization. Development of progressively advanced personal organization is due to the individual's interaction with his environment. This means that the individual's actions upon the environment construct his forms of experience. These experiential products of his constructive activity feed back upon his organization which originally set the whole functional pattern into motion. That is, these experiential products inform the person's organization that constructed them. When this information is discrepant with the existing organization

the conditions are propitious for progressive change in the individual's organization and adaptation in order to accommodate the anomolous forms. Progressive change means an advance in the structure and functioning of the person; and concomitantly it also means an advance in his forms of interacting with his environment. Thus, the self-generative or self-constructive cycle of personal development and interaction begins at birth and progresses through the sequence of developmental stages until the individual attains his most mature form.

In order to begin to understand the self-generative character of the equilibration process of development it is necessary to elucidate a central feature of stage organization that is often overlooked. Typical portrayals of the nature of stage sequences, such as the one presented here, are communicated as if an individual is at only one stage, such as the intuitive stage, i.e., as if his organization is composed of only intuitive functional structures and not sensorimotor or concrete operational functional structures as well. Now, in most instances this is an incomplete portrayal of stage development.

Typically, individuals are predominantly at one stage in their development. At the same time individuals are also subordinately at other stages of their development. This almost perpetual state of "stage mixture," as it has been appropriately labeled by Turiel (1969), is a feature of the self-generated structural disequilibrium that is a necessary condition for developmental change. Turiel (1969) has also provided us with a detailed analysis of the evidence on stage mixture and its consequences for moral development.

A model of stage organization must therefore portray a vast network

or open grid system of functional structures of different levels and centrality. This gridwork radiates outward and is open on the outside so as to interact with the physical and social environment. The dynamics of life are such that the gridwork is in constant interna and external interaction. Consequently, one would expect constant mobility; particularly, when the individual is in a situation where for structural and adaptive reasons his gridwork resonates to anomolies or discrepancies between some part of its organization and some part of the environment. Of course, the conception of stage mixture ensures the inevitability of interactive discrepancies between part of the individual's functional structures and part of his environment.

Consequently, what one should find is a constant shift at different points in the system, reflecting the expectation that the individual is always in dynamic equilibrium or at a mixture of different stages all the time. Thus, one can begin to understand the metaphor of "pulling oneself up by one's bootstraps" as an appropriate metaphor for the self-generative process of development.

Principles of Regeneration

It is the equilibration process of self-generative development that we must capitalize upon in order to reeducate or redevelop culturally deprived adolescents so that they will actualize their potential forms of physical and social interaction. We are, then heavily banking upon the individual's processes of spontaneous regeneration which is the significant meaning of spontaneous recovery. And as we know on an actuarial basis, one's best bet as between different forms of intervention is to capitalize upon

the individual's own mechanisms for spontaneous recovery or regeneration (e.g., Eysenck, 1952).

This thesis presumes that there is fundamental convergence, if not necessarily identity, between biological generation and regeneration. Furthermore, this thesis presumes fundamental convergence, whether the processes of biological change are physiological or psychological. The present view is similar to but extends that generally held on physiological change:

> "The perfection of the convergence between ontogenesis and regenesis should not be overstressed. It is usually extremely good, but mistakes sometimes occur and the lizard's tail habitually regenerates a rather makeshift for the original structure."
>
> "It must also be remembered that the power of regeneration is as ancient as that of ontogenesis itself, that asexual reproduction and other morphogenetic processes grade into that of regenesis, and that ontogenesis and regenesis have evolved together, step by step, throughout their long history. It would perhaps be surprising to find anything but quite close convergence between them. It also seems probable that in general the same genes control both." (Needham, 1961, pp. 1255-1256)
>
> "Are the same genes that direct the original ontogeny also utilized to regenerate an appendage? There seems to be little reason to believe otherwise. With rare exceptions, what regenerates is a duplicate of the original." (Goss, 1969, p. 6)

Previously I have argued (Langer, 1969, Ch. 5) the case that the lawful and heuristic study of development must proceed from the determination of universal principles of change; and that these principles are fundamentally principles of self-generation. Here I would merely extend this argument to apply to the study of regeneration. It would read as follows: The lawful study of developmental rehabilitation is fundamentally the determination of universal principles of self-regeneration that are the source of reactivating

mental progress. A good initial working hypothesis is that there is much convergence between the principles of self-generation and self-regeneration.

This working hypothesis will direct our explorations on mental regeneration. These explorations will be further guided by considerations of how best to capitalize upon and nurture the individual's capacities for self-regeneration.

We begin by establishing criteria for determining whether progressive or regressive change has occurred. Elsewhere (Langer, 1969, Ch. 5) I have specified the criteria in some detail; here I will simply enumerate them. The criteria for assessing the occurrence of progress are:

(1) Change in the form, not the content, of interaction;

(2) Conservation of the change--stability;

(3) Increased adaptiveness--quantitative;

(4) A qualitative advance in functioning--a shift in dominance from environment to the person such that he takes an increasingly active role;

(5) A decrease in the role of chance--change is progressive if the person increasingly acts to construct efficient means of adaptation and self-organization.

It should be obvious, then, that regression is said to occur only when there has been (a) a change in the form of interaction that is (b) stable and (c) decreases adaptiveness, such that (d) the functional dominance shifts to the environment and (e) increases the role of chance.

Long-term, developmental change, as noted earlier in this paper, is governed by the self-generative process of equilibration. This process is

a dialectic between the dynamics towards generating coherence and generating directedness (Langer, 1970a). These dynamics constitute the universal rules of self-regulating the person's actions in his environment. Therefore, they essentially constitute the universal self-regulatory mechanisms of development:

> "We must formulate two sets of self-regulatory rules and their method of interaction. The first set of formal rules applies to the self-regulatory mechanism of coherence. These are conservative rules that, so to speak, tell the child not to accommodate to novel experiential nourishment, to ignore new facts or to treat them as familiar, already well-digested experiences (information) so that they can be easily assimilated to prior schemes. The second set of rules applies to the self-regulatory mechanism of progressive directionality. These are transformational rules that, so to speak, tell the child not to assimilate novel experiences (information) to prior schemes, but to discover new and anomalous facts and construct new schemes to accommodate them. When the conservative mechanism of coherence is dominant, the child is in a relatively stable state and there will be no change. When the balance tips in favor of the progressive mechanism, then the disequilibrating conditions for change are present. The child will develop new functional structures that can accommodate novel experiences so that the self-regulatory mechanism of coherence is once more dominant and the child is in a state of greater equilibrium." (Langer, 1969, p. 169.)

The self-generative nature of action and development is the basic reason why extrinsic inducement of long-term change is inherently difficult to achieve. Indeed, extrinsic methods may rather lead to, at least, short-term or temporary debilitation. The evidence on the lack of success in inducing more than minimal change via a variety of extrinsic tuitional methods has already been indicated. Here it should be added that we have some data demonstrating that certain forms of tuition lead to temporary debilitation in conceptual operations (Langer, 1969a).

Much note has already been taken by investigators (e.g., Inhelder & Sinclair, 1969; Langer, 1969a; Turiel, 1969) of the conformity of these

results to the empirical expectations deriving from the theory of equilibration. What has not been clearly recognized in this connection is the significance of the negative results on extrinsic attempts to induce regression. The data on regressive change provide particularly powerful further confirmation for the theory that the self-regulatory mechanisms of equilibration serve to maintain the organizational integrity of the organism throughout its development.

We have already mentioned the resistance of children to extrinsic inducement of regression to one stage below their predominant stage of moral reasoning. We are now beginning to find parallel results for logical reasoning (Kuhn, 1969). In Kuhn's study four, six, and eight-year-old children were exposed to models dealing with classification problems (taken from Inhelder & Piaget, 1964) at different levels in relation to the childrens' predominant pretest stage. Very little change was induced. Insofar as change was obtained, the children observing a model performing at a slightly higher structural level than their own were most affected. Children observing a model performing at a considerably higher level than their own were affected less. The least affected were children observing a model performing at a slightly lower structural level than their own.

It may come as little surprise that it is nigh impossible to induce progress to stages that have not yet developed because the requisite functional structures are not yet present. But the difficulty in extrinsically inducing regression in reasoning to a stage which the person has just passed through is on its face highly surprising. After all, the individual is simply in the position of merely having to exercise reasoning capacities that he has already developed. The finding is, however, completely consistent with the

conservative rules of self-regulatory coherence which is the source of resistance to extrinsic inducement of change, whether progressive or regressive.

The thesis that mental regeneration is a self-regulatory phenomenon leads to two interrelated implications. The first is in the terms of the criteria I have set for developmental progress and regress. The culturally deprived adolescents in Youth Aliyah are probably not greatly regressed in their potential forms of interaction. Thus, the first implication is that the rudimentary functional structures necessary for developmental rehabilitation to at least the concrete operational stage must be present. Otherwise mental regeneration is no more possible than for any biological organization. The reason is simple. Heinz Werner once put it as "Out of nothing there is not coming something." Or:

> "In order to replace a missing structure, something must be left behind as a source of new building materials. Regeneration can replace a part, but never a whole..."
> (Goss, 1969, p. 2.)

> "It is axiomatic that regeneration cannot occur unless there remains something to regenerate from--some part of the organism to provide the right genetic information for morphogenesis."
> (Goss, 1969, p. 18.)

In this context it would do well to dwell briefly upon a feature of Youth Aliyah's program to nurture redevelopment via group care in a normal residential setting. A basic aim of this group care is to provide culturally normal models for culturally deprived individuals to imitate. Although this is probably a sound approach we must realize its limitations. It is limited by the stage of cognitive competence with which the culturally deprived enter the group setting. The studies that demonstrate that subjects can hardly learn to imitate moral and logical reasoning that is above their

initial level have already been outlined (Turiel, 1969; Kuhn, 1969). It should merely be added that in another study we have found that imitative behavior itself is determined by the childrens' level of cognitive competence (Kuhn & Langer, 1968).

All this is to point out that the person's stage of cognitive and social development is the prime determinant of his ability to imitate, rather than the reverse. Imitation does not lead to development. The rehabilitative utility of social models is conditioned by the level to which the culturally deprived individual has retained functional structures for interaction.

The second related implication is that the personal organization that the culturally deprived individual retains is governed by the process of equilibration. Extrinsic inducement to change can only be effective within the context of the self-regulatory rules of coherence and directedness. In this regard we may consider another basic feature of group care in a normal residential setting. This is the attempt to establish some discrepancy between the level of any given culturally deprived individual and the people with whom he is interacting. The idea, it seems, is to keep him interacting with both (a) people who are functioning at a lower level, so that he will gain confidence to perform in the same area of functioning, and (b) people who are functioning at a higher level, from whom he can learn.

This is a promising experimental idea, but it is still within the realm of research ideas. If the individual has the requisite structures to recognize the discrepancies, then we may have the conditions necessary

for organizational disequilibrium and developmental change. We are currently, particularly with Elliot Turiel, involved in experiments on this question with individual subjects. At the group level the question is a much more difficult one to investigate in a controlled experimental fashion. Yet this is precisely what must be done. The approach will probably have to first be that of simulating the residential group setting in a laboratory situation. In this way it should be possible to examine the effects of differentially stratified groups upon culturally deprived individuals.

There is a fundamental question that remains. This is the matter of timing. When is the best time in the growth cycle of the culturally deprived child to begin intervention? It seems that the actual course of development is the best initial hypothesis. The implication of such a hypothesis is that it is best to attempt to get the child back on the natural track as early as cultural deprivation is spotted. But, this isn't always possible because of practical restrictions.

Furthermore, we can bank upon the conservative nature of developmental processes since we know that they result in phenotypical actualization at the stage of concrete operation and conventional morality in practically every society that has been looked at. So we can assume that most children will reach that stage of development; whether a little bit faster or a little bit slower, they will actualize their potential for concrete operations and conventional morality.

But, at the same time, we know that it is probable, though we have no definitive evidence at this point, that the genotypical potential for the development of formal operations and principled morality is not usually

actualized. A fair guess is that no more than a third of the population ever reaches this level, if a third of the population does. This is true, I believe, of all cultures, although we have no definitive evidence at this point except on moral development.

We can also capitalize upon the hypothesis that the greatest potential for self-regulation takes place during adolescence when individuals become increasingly self-conscious and aware of their own conduct. This suggests the hypothesis that if you have to pick only one period for intervention to nurture mental regeneration, early adolescence is a prime target.

Now, the obvious question that follows is the optimal relation between speed of development and the stage of development that is actualized. It may well be that the child has to progress through the stage sequence at a certain rate or he will not actualize his full potential. But we do not know and this must therefore remain an open research hypothesis.

Conclusion

The prospects seem to be the following. There is good experimental evidence to demonstrate that, with rare exceptions, the mechanisms governing physiological generation and regeneration are the same (Goss, 1969). The reason for this complex parallelism is simple. A total organization can not be created out of whole cloth. At least a part structure, with its rules of self-regulation, must be present for either generation or regeneration to be possible. In the case of injury to an organ, the potential for regeneration is limited by the part that remains. That part is part of the organ ordinarily present in the course of development. Out of it can only be generated structures that would ordinarily evolve. The rare excep-

tions occur when (a) the shock of the injury deflects the normal course of development or (b) the environment is fundamentally hostile to rehabilitation. However, the conservative rules of self-regulation insure that the exceptions are indeed rare when regeneration occurs. Since the beginning and the end of regeneration are usually identical with that of generation we can safely conclude that there is fundamental convergence between their developmental courses. Again the experimental evidence is confirming (Goss, 1969).

Psychological phenomena are a subclass of biological phenomena. Consequently, it may be expected that the same convergence between the processes of generation and regeneration obtains for mental change. It is clear that any developmental process of mental regeneration can only begin at some point on the sequence of stage organization. It appears, although the evidence is much more tenuous than on physiological regeneration, that developmental rehabilitation ends at some point, further along, on the stage sequence. If the beginning and end stages of mental regeneration are the same as mental generation, then there should be fundamental convergence between their courses and mechanisms. It is this theoretical deduction that requires much empirical investigation if we are to be successful in developing the potential of culturally deprived people.

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